

## ACCEPTED VERSION

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## Interpersonal trust, vigilance and social networks roles' in the process of entrepreneurial opportunity recognition

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**Abstract:** This research examines the roles that an entrepreneur's dispositions to interpersonal trust, and vigilance play in the process of opportunity recognition. An entrepreneur's use of social networks as a resource in opportunity recognition is also examined. The basis of this investigation was an empirical study of information and communication technology (ICT) entrepreneurs in Queensland, Australia. A series of twelve hypotheses were developed and tested in this research. Despite a modest sample size, six of the hypothesised relationships were supported. An entrepreneur's dispositions to both trust and vigilance effected the outcomes of their opportunity identification behaviours. A disposition to excess vigilance inhibited the development of entrepreneurial opportunities. While, an extended social network and a trusting disposition were found to facilitate the development of entrepreneurial opportunities.<sup>1</sup>

**Keywords:** entrepreneurship; trust; vigilance; social networks; opportunity recognition.

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**Biographical notes:** Scott Gordon is a doctoral student and senior research assistant with the Brisbane Graduate School of Business at Queensland University of Technology. His research examines the processes that enable entrepreneurial emergence, and underlie entrepreneurial decision making. His interests include cognitive and social network approaches to entrepreneurship, information fusion and pattern recognition. His current research is focused on entrepreneurial opportunity recognition. Mr. Gordon originally trained as an electronics engineer. He received his Bachelor of Engineering from the University of Southern Queensland, and recently completed his Master of Business Administration with First Class Honours in Entrepreneurship at Griffith University.

## **1 Introduction**

Attempts to identify a specific set of characteristics or to define the psychological profile which distinguishes entrepreneurs from non-entrepreneurs have had mixed success (Smilor, 1997). Consequently, progress in entrepreneurship research has shifted focus (Gartner, 1988; Low and MacMillan, 1988) from arguments based on an entrepreneurial type of person, to studies of the processes which enable the entrepreneurship phenomenon (Ucbasaran et al., 2001), such as opportunity recognition (Shane and Venkataraman, 2000). One approach to opportunity recognition that is starting to attract attention is based in theories of social capital (Davidsson and Honig, 2003), and social networks (Hills et al., 1997; Singh, 2000). In addition, the empirical research on opportunity recognition based in social networks has generally supported the theory (Hills et al., 1997; Singh, 2000).

The context in which entrepreneurs act, be it within their businesses, industry sectors, or as part of a wider economic community, is embedded in a network of social relations (Aldrich and Zimmer, 1986). By taking this social perspective of entrepreneurship, entrepreneurs are recognised as something more than atomistic economic agents. This argument for social embeddedness requires that the study of economic activity must include an examination of the social context within which economic action occurs (Uzzi, 1996), since the social dimensions of transactions are central in explaining control and coordination in the exchange (Larson, 1992). However, trust is not a term which is widely used in the literature which examines the economics of organisation; rather, the focus is on contracting and exchange relationships between self-interested agents (Miller, 2001). Though it has been recognised that trust has real, practical, economic value as it is seen to increase the efficiency of the economic system (Arrow, 1974). In fact, as Dibben (2000) points out, trust is crucial to the development of small business, and organisational emergence.

Previous research which has examined trust employed small business as the setting (Dibben, 2000), however this research aims to investigate the processes of entrepreneurship with a focus on trust. While the roles that trust and vigilance play in entrepreneurial networks has received some theoretical attention (Larson, 1992; Uzzi, 1997; Das and Teng, 1998; Burt, 1999); there is a distinct lack of research investigating the relationships between trust, vigilance and the specific process of opportunity recognition within entrepreneurship. It is this gap in the literature that this research seeks to address.

## **2 Opportunity recognition**

Entrepreneurship has been defined as the discovery, evaluation and exploitation of future goods and services (Venkataraman, 1997). Entrepreneurship is a process which is characterised by the pursuit of opportunity (Stevenson and Jarillo, 1990). Consequently, an entrepreneur is someone who recognises an opportunity and, in many cases, creates a new venture to pursue it (Bygrave and Hofer, 1991).

Eckhardt and Shane (2003, p.336) define entrepreneurial opportunities as “situations in which new goods, services, raw materials, markets and organizing methods can be introduced through the formation of new means, ends, or means-ends relationships”. They exist because different agents have different beliefs about the relative value of

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resources when they are converted from inputs into outputs (Kirzner, 1979; Shane and Venkataraman, 2000).

In describing the process of entrepreneurial opportunity recognition Ardichvili et al. (2003) delineate three elements: opportunity identification, opportunity development, and opportunity evaluation. Their model outlines that the initiation or identification of an opportunity, may be through either of three distinct processes: perception, discovery or creation (Ardichvili et al., 2003). A development phase follows opportunity identification. The development phase is a “continuous, proactive process essential to the formation of a business” (p.109). The third element, evaluation, is included as a continuous overarching process of interrogation of the opportunity which seeks to identify “suboptimally deployed resources” (p.113). This research examines the all three elements of the Ardichvili et al. (2003) model, however the particular focus is on the opportunity identification and opportunity development steps.

#### *2.1 Opportunity identification*

Ardichvili et al. (2003, p.109) says that “opportunities begin as simple concepts that become more elaborate as entrepreneurs develop them”. Opportunity identification has been proposed as a process which begins with an initial vision, or business idea, and develops this into an elaborated vision, or business opportunity (Long and McMullan, 1984). Timmons (1999) found that while business ideas are central to business opportunities, not all ideas are sufficient to be considered opportunities. Singh (2000, p.49) supports a developmental version of opportunity recognition as a linear process, stating that “before business opportunities are recognised, new business ideas must be identified.” Long and McMullan’s (1984), Timmon’s (1999), and Singh’s (2000) approaches, where the concept of a business idea is different from a business opportunity, are essentially consistent with the one proposed by Ardichvili et al. (2003).

Where a business idea consists of the initial creative cognition (Krueger, 2000), perhaps derived from prior experience (Shane, 2000), or information accessed through social channels (Singh, 2000); the business opportunity, has been in some way assessed to be a potentially viable new venture. In other words, the business opportunity is a screened (Timmons, 1999), evaluated (Ardichvili et al., 2003), or elaborated (Long and McMullan, 1984) business idea, that is both desirable and feasible (Christensen et al., 1994). However, as Singh (2000, p.24) points out, at this stage of the process “opportunity is independent of resources controlled”. Thus, the concept of a business opportunity lies somewhere between initial idea identification and the complete development of the opportunity as an emerging entrepreneurial venture.

#### *2.2 Opportunity development*

The next logical step in the process is an increased level of commitment to the development of the business opportunity. In doing so the entrepreneur seeks to act on their business opportunity, and takes the explicit decision to pursue the opportunity. Accordingly, the entrepreneur begins to assemble the resources required to exploit the value in their opportunity. The entrepreneurs goal is to take advantage of their opportunity (Singh, 2000). Those entrepreneur’s who decide to pursue their opportunity may also formalize this by creating a new business venture.

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Change and adaptation are accepted as integral components in the entrepreneurial process (Brazeal and Herbert, 1999), and changes to opportunities are facilitated by changing perceptions (Krueger, 2000). It is in this sense that an entrepreneur's social context is important; as they access the information and critical feedback, available through their social network, in order to assess their developing opportunity and adapt it if need be.

### **3 Social networks**

An important way that people gain access to information is through interaction with other people (Shane, 2003). Therefore, one of the ways that people gain access to information about entrepreneurial opportunities is through their social network. Social networks allow access to different human skills and knowledge, which enable the entrepreneur to learn from others experience. Busenitz et al. (2003) points out that entrepreneurs become alert, develop knowledge, and make deliberate informational investments (Fiet, 1996) that others do not in order to create a coherent view of opportunity. Thus, the information flows among members of an entrepreneurial network are important to opportunity identification and development. Access to an increased level of information available through a larger social network has been theorized to be the main benefit in this case (Hills et al., 1997), empirical evidence supports this theory (Singh, 2000).

Hills et al. (1997) found that entrepreneurs who accessed social channels in order to identify business ideas reported significantly more ideas than those entrepreneurs who did so in isolation. Singh (2000) undertook an empirical study examining the opportunity recognition characteristics of American ICT entrepreneurs; finding that entrepreneurs who maintained larger social networks identified more business ideas. Based on informational theories of entrepreneurial opportunity recognition (Kirzner, 1979), and drawing on the findings of Hills et al. (1997) and Singh (2000), the following hypotheses are proposed:

*Hypothesis 1a: The number of business ideas recognised by an entrepreneur is positively associated with the size of their social network.*

*Hypothesis 1b: The number of business opportunities recognised by an entrepreneur is positively associated with the size of their social network.*

It is likely to be the case that entrepreneurs with larger social networks access more support, and other resources with which to actively pursue opportunities. Hills et al. (1997) found that network entrepreneurs pursued more opportunities than solo entrepreneurs. The reasoning here is, with access to more information through their social networks, with which to identify opportunities, the network entrepreneur would have more opportunities from which to choose as being worth pursuing. Singh's (2000) empirical work also found a positive relationship between the size of an entrepreneur's social network and the number of opportunities that they pursued. Drawing on these findings, and previous discussions of opportunity recognition, and social networks the following hypothesis is proposed:

*Hypothesis 2a: The number of business opportunities pursued by an entrepreneur is positively associated with the size of their social network.*

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De Koning (1999) found that entrepreneurs used extensive networks to assist the evolution of their business opportunities. Thus, it is also likely that entrepreneurs will adapt their opportunity further as they take on more information, through a larger social network. This follows a similar line of reasoning to the argument above, regarding the pursuit of opportunities. In this sense the entrepreneur accesses feedback from their social network with which to develop their opportunity. The following hypothesis is proposed:

*Hypothesis 2b: The level of change in a business opportunity prior to firm founding is positively associated with the size of an entrepreneur's social network.*

It is likely that an entrepreneur's trusted friends within their social network influence their information gathering activities (de Koning, 1999). Davidsson and Honig (2003) identified that the presence of strong or trusted ties in the social networks of nascent entrepreneurs influenced their level perseverance in pursuit of their venture formation ambition (Hoang and Antoncic, 2003). Of particular interest to this research, and its focus on opportunity recognition, is the fact that a social network governance based in trust, is seen to "affect the depth and richness of exchange relations, particularly with respect to the exchange of information" (Hoang and Antoncic, 2003, p.170).

## **4 Interpersonal trust**

Trust has been called a 'lubricant' for co-operation (Arrow, 1974), and is considered necessary for understanding interpersonal and group behavior as well as economic exchange (Hosmer, 1995). Trust can be considered to constitute an important source of social capital (Kramer, 1999). Trust may be manifested as a commitment to an exchange before knowing how the other person will behave (Burt, 1999). Lewicki et al. (1998) called trust a 'foundation' for interpersonal relationships, and for cooperation. That trust may be seen as a foundation for the exchange of information in interpersonal relationships underscores the importance of an investigation of its role in the process opportunity recognition.

Some have assumed that trust, in a general sense, equates to gullibility (Jones, 1996). This interpretation of trust, as a form of gullibility, shows that trust means different things to different people. These differences are born out in the research on trust, which is relatively diverse and multidisciplinary (Dirks and Ferrin, 2001; Lewicki et al., 1998). Rousseau et al. (Rousseau et al., 1998) summarize the interdisciplinary differences, between the economic, psychological, and sociological views of trust, as follows: Economists often take a calculative view of trust (Williamson, 1993); as a rational choice between the risks and benefits of trusting, which is often expressed as the probability of cooperation. The discipline of psychology frames trust in terms of the (Rousseau et al., 1998, p.393) "attributes of trustors and trustees and focuses upon a host of internal cognitions that personal attributes yield" (Rotter, 1967; Rousseau et al., 1998); while sociologists attribute trust to the properties of social relationships (Granovetter, 2000).

Trust has been defined as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau et al., 1998, p.395). As Rousseau et al. (1998) discuss trust, they find common ground between scholars from various fields. According to their definition trust entails three salient properties: a willingness to be vulnerable (Kramer, 1999) an involvement of risk (Das and Teng, 1998) and thirdly interdependence (Mayer et al., 1995; Sheppard and

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Sherman, 1998). This definition mirrors Kramer (1999, p.571) who states that “perceived vulnerability or risk” in relation to “others on whom they depend” are the elements of the psychological state of trust.

It is apparent, that when entrepreneurs involve others in the development of their business opportunity, this involves some level of risk. The risk is that the information they share regarding that opportunity, which forms the essence of their entrepreneurial endeavor, may be used opportunistically by those others with whom they share it. Reynolds (1991, p.64) compares this social risk, with the market risk of business creation, and frames it thus: “it is quite likely that potential entrepreneurs find it more comfortable to take the risks of starting new firms when the major dangers are associated with the marketplace, not the risk that a friend or associate will attempt to take advantage of them at a very vulnerable time”. On the other hand, Uzzi (1996) suggests that an advantage of trust is that it facilitates fine-grained information transfer. Fine-grained information, would be of particular use in identifying entrepreneurial opportunity. Thus, an entrepreneur’s disposition towards trusting others would effect both the identification and development of opportunity.

#### *4.1 Dispositional trust*

There is empirical evidence that people have a general predisposition to trust (Gurtman, 1992), and that it is a relatively stable personality characteristic (Kramer, 1999). Rotter (1980) defines dispositional trust as a generalized expectancy in the reliability of other people. It is in the case where people have little experience of each other, or meet in ambiguous situations that dispositional trust explains their trusting behavior most accurately (McKnight et al., 1998; Rotter, 1980).

Entrepreneurial social networks can be dynamic (Greve and Salaff, 2003), and the context in which they are formed and function may be ambiguous (Shane and Venkataraman, 2000). Also, entrepreneurial opportunities may have brief time windows (Busenitz et al., 2003) in which they must be realized. Thus, it would be sensible that dispositional trust, be included in any consideration of entrepreneurial networks, and their roles in opportunity recognition.

#### *4.2 Distrust and vigilance*

Recently, organizational researchers have considered that it is possible for trust and distrust to co-exist simultaneously (Lewicki et al., 1998; Wicks et al., 1998). Lewicki et al. (1998, p.438) found that while “incentives to collaborate and trust certainly exist, there are simultaneous reasons to distrust relationship partners”. Wicks et al. (1998) go further to say that a mixture of trust and distrust, is in fact ‘optimal’, and that this should be the focus of research. Smilor (1997) found that effective entrepreneurs take calculated risks. Entrepreneurs, it would seem, endeavor to strike an optimal balance between risk and trust, they are not prepared to risk everything and thus trust completely. It follows, then, that there is a need to include distrust in any analysis of trust’s role in entrepreneurship.

The conceptualisation of trust and distrust, as a two factor model shows that trust beliefs are separate and distinct from distrust beliefs, and that trust and distrust cannot be reduced to opposite ends of a continuum (Lewicki et al., 1998). It may be the case that distrust has some very real beneficial outcomes, in sense of guarding against opportunism

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(Elangovan and Shapiro, 1998), as trust itself does not guarantee trustworthy behavior in return (McEvily et al., 2003). Thus, a sense of wariness, vigilance, or distrust (Kramer, 1999), is something that should be accounted for in the same manner as the potentially beneficial outcomes of interpersonal trust.

Kaish and Gilad (1991) found that entrepreneurs paid special attention to risk cues about new opportunities. Thus, an entrepreneur's disposition to vigilance would also very likely effect their assessment of information relating to business opportunity.

## **5 Trust, vigilance and opportunity recognition**

### *5.1 Trust, vigilance and opportunity identification*

In examining the effect of trust or vigilance on opportunity identification, the evidence of clearly established relationships between these constructs is ambiguous. Some researchers have characterised entrepreneurs as disposed to distrust (de Vries, 1996). In examining entrepreneurship, de Vries's (1996) empirical research found that a need for control, and a sense of distrust were common themes. Smilor (1997) states that entrepreneurs possess a desire for control, as they seek to determine their own destinies. Given the entrepreneurs predilection towards controlling their destiny, they may be disposed towards higher levels of vigilance, and potentially lower levels of trust (Das and Teng, 1998).

An alternate perspective is that an overarching disposition to distrust is detrimental to entrepreneurship (Granovetter, 2000). With respect to entrepreneurs and their social networks Granovetter (2000) found that "one of the most powerful and obvious impediments to economic activities is a pervasive mistrust of others." Though Granovetter (2000) concedes that trust is often limited in the conduct of business.

What is likely though, is that aspects of both these viewpoints are true. This approach calls for equilibrium between the alternate views of trust and distrust. Gurtman (1992) concluded that dispositional extremes of either distrust or trust are associated with interpersonal difficulties. Therefore, balanced dispositions to trust and vigilance should be of most benefit to the exchange of information, and thus access to opportunities. However, these relationships need to be tested. Drawing on these findings, and previous discussions of literature relating to opportunity identification, and interpersonal trust the following four hypotheses are proposed:

*Hypothesis 3a: The number of business ideas recognised by an entrepreneur is associated with their disposition to trust.*

*Hypothesis 3b: The number of business ideas recognised by an entrepreneur is associated with their disposition to vigilance.*

*Hypothesis 3c: The number of business opportunities recognised by an entrepreneur is associated with their disposition to trust.*

*Hypothesis 3d: The number of business opportunities recognised by an entrepreneur is associated with their disposition to vigilance.*



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## 5.2 Trust, vigilance and opportunity development

Considering dispositional trust, and vigilance in relation to the development of entrepreneurial opportunities, arguments may be drawn that a disposition toward higher trust, in the absence of excess vigilance would encourage the pursuit and development of entrepreneurial opportunity. Lewicki et al. (1998) proposes this; and identified that a combination of high trust and low distrust, and consequently low vigilance, leads to the pursuit of opportunities.

It has also been argued that trust in its broadest sense is simply having confidence in the realization of your expectations (Luhmann, 1979). In this manner, a disposition toward trust may be linked with the pursuit of opportunity. Such that the entrepreneur in pursuing an opportunity, takes the decision to realize their expectations. However, a disposition to excess vigilance, and wariness, may be seen to inhibit the active pursuit of opportunities. Thus, in relation to findings from the literatures of opportunity development, and interpersonal trust, the following two hypotheses are proposed:

*Hypothesis 4a: The number of business opportunities pursued by an entrepreneur is positively associated with their disposition to trust.*

*Hypothesis 4b: The number of business opportunities pursued by an entrepreneur is negatively associated with their disposition to vigilance.*

Similarly, an excessively vigilant disposition may affect the entrepreneurs willingness to take on feedback with which to adapt their opportunity. While a disposition toward trust may result in an openness toward taking on feedback regarding ways to adapt an opportunity. However, these inferences drawn from the literature, must be tested. Thus, the following two hypotheses are proposed:

*Hypothesis 4c: The level of change in a business opportunity prior to firm founding is positively associated with an entrepreneur's disposition to trust.*

*Hypothesis 4d: The level of change in a business opportunity prior to firm founding is negatively associated with an entrepreneur's disposition to vigilance.*

## 6 Research methodology

### 6.1 Research design and sample

This research was designed as a cross-sectional study. The data for this study were collected using an online self-report questionnaire. Industry effects on opportunity recognition were controlled by setting the research within a single industry. The information and communications technology (ICT) industry in Queensland, Australia was chosen as an appropriate setting for the investigation of entrepreneurial opportunity recognition, as it is predominated by small businesses displaying entrepreneurial attitudes towards growth (Queensland Department of State Development and Innovation, 2003).

The sample population for this study was drawn from the Queensland ICT Products and Services Guide (Information Industries Bureau, 2004). The products and services guide, is an online database, which lists the details of over 500 Queensland ICT

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companies. The chief executive officers of these ICT companies formed the target sample for this study.

Of the 571 directors of Queensland based ICT companies invited to participate in the study, 78 survey responses submitted. Of the 78 completed surveys received 9 were deemed to not meet validation criteria, as the respondents were either were not founders of their business (7 respondents), were franchisees (1 respondent), or were not responsible for the generation of new business ideas (1 respondent). A further 6 responses did not contain complete survey forms. As such 63 valid and complete online survey responses were received from ICT entrepreneurs. Which corresponded to a response rate of 11.0 percent. These 63 responses formed the basis of all analyses.

Ancillary data on the number of firms located within in each of 10 geographic regions across Queensland was cross-tabulated with that from which survey responses were received. A Pearson Chi-Square test indicated that there was no significant non-response bias ( $F = 0.363$ ,  $\chi^2(9, 642) = 6.19$ ,  $p = 0.720$ ), with each region represented in similar proportion between the original sampling frame and the survey responses received.

#### *6.2 Survey instrument and variables*

The design of the questionnaire drew heavily on the work of Singh (2000) who developed an instrument to measure both entrepreneurial opportunity recognition, and social network characteristics. A number of other published sources were adapted and used in the construction of measurement scales. Validity was established through the use of these pre-existing, validated, measurement scales, where possible, and framing them in the context of this research. The survey also established internal validity; using a series questions to screen the respondents, as being part of the target sample of 'entrepreneurs', from those who were not.

Prior to administering the final survey instrument, it was pre-tested. This pre-testing allowed the assessment of the reliability for the various measurement instruments in the survey questionnaire, particularly the newly adapted trust and vigilance scales. Data from the pre-test survey was used to calculate reliability statistics for all multiple item measures. Survey items which reduced the internal consistency of the scale, were either modified to improve clarity, or removed from the final instrument.

#### *Dependent variables*

Four variables were conceptualised for the entrepreneurial opportunity identification and development construct (Ardichvili et al, 2003). Two variables measured the opportunity identification construct: the number of business ideas recognised, and the number of business opportunities recognised. Another two variables were used to measure the development of opportunity: the number of opportunities pursued, and the change to an opportunity. All four of these variables used measures developed in previous studies of opportunity recognition (Singh, 2000), and adapted for this study.

*Business ideas, business opportunities, opportunities pursued:* The three variables which quantified the number of ideas recognised, opportunities recognised, and the opportunities pursued, were measured using three survey items each. These three items asked the respondent to quantify their opportunity recognition over three time periods: the previous month, the past year, and the past 5 years. The responses were originally measured using a 7 element ordinal-scale, which ranged from no opportunities

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recognised, through to 10 or more opportunities. The responses were coded as 0 for 'no opportunities'; 1 for 'one opportunity'; 2 for 'two opportunities'; 3 for 'three opportunities'; 4.5 for 'between four and five opportunities'; 7.5 for 'between six and nine opportunities', and 10 for 'ten or more opportunities'. Composite scales for the business ideas recognised, opportunities recognised, opportunities pursued, were then computed as the arithmetic mean of the 3 survey indicator items measured over the previous month, year and five years. Consequently values for these three opportunity recognition variables ranged from 0 to 10. The Cronbach alpha reliability scores for these measures were: business ideas  $\alpha = 0.86$ ; business opportunities  $\alpha = 0.90$ ; opportunities pursued  $\alpha = 0.85$ .

*Change in opportunity:* The change to an opportunity was measured using two questions in the survey, which asked "How much did you modify your opportunity?" With the context of the change between first having the idea for the current business and the recognition that this was viable business opportunity. As well as the change between the recognition of the business opportunity and founding the firm to pursue that opportunity. The responses for these two questions were measured using a 5 element Likert-scale, which was coded as, 1 for 'no change'; 2 for 'slight change'; 3 for 'moderate change'; 4 for 'major change'; and 5 for 'completely changed'. As with other composite measures the arithmetic mean was used to aggregate the coded responses, resulting in a measure which ranged from 1 to 5. The Cronbach alpha reliability score for this measure was  $\alpha = 0.70$ .

#### *Independent variables*

*Dispositional trust:* The measurement of the dispositional trust variable used 8 items adapted from scales used in prior studies which measured generalised dispositional trust (Rotter, 1967; Wrightsman, 1964; Yamagishi, 1992), framing them in an entrepreneurship context, where possible. Questions asked "Based on your experience, please respond to the following statements", and listed a number of statements about trust and responses were measured using a 5 element Likert-scale, from 'strongly disagree' to 'strongly agree', which were coded from 1 to 5, respectively. Five items in this adapted instrument were drawn from the Rotters (1967) Interpersonal Trust Scale; one was drawn from Wrightsman's (1964) Philosophies of Human Nature Scale; and two were drawn from Yamagishi's (1992) adaptation of the original trust scale developed by Rotter (1967). These source items were chosen for this research as their validity and reliability had been previously established (Wrightman, 1991; Yamagishi et al., 1999). The Cronbach alpha reliability score for this measure was  $\alpha = 0.73$ .

*Dispositional vigilance:* The measurement of the dispositional vigilance variable used 3 items adapted from scales used in prior studies (Currall and Judge, 1995; Yamagishi, 1992). Two items were drawn from Yamagishi's (1992) vigilance scale, and the third was adapted from an instrument developed by Currall and Judge (1995). The Cronbach alpha reliability score for this measure was  $\alpha = 0.70$ .

*Social network size:* The size of an entrepreneur's social network, was operationalised as the number of social contacts they had discussed their opportunity with prior to founding their firm. This variable was measured using a 6 element ordinal-scale, which ranged from, from 'no social contacts', through to '11 or more contacts'. Responses in this ordinal scale were and coded as 0 for 'no contacts'; 1 for 'one contact'; 2 for 'two contacts'; 4.5 for 'between three and five contacts'; 8 for 'between six and ten contacts';

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and 11 for 'eleven or more contacts'. Therefore, values for this variable ranged from 0 to 11.

#### *Control variables*

There were six control variables used in the analysis: gender, ethnicity, age, experience, education, and firm age.

*Gender:* The gender of the respondent was used as a dummy variable which was coded as 1 for female or 2 for male. *Ethnicity:* Responses for this measure were transformed into a single dummy variable which indicated the ethnicity of the entrepreneur as 'Australian' which was coded as 0, or 'non-Australian' which was coded as 1. *Age:* The respondents age was measured using an interval scale. *Experience:* The number of years of ICT industry experience was also measured using an interval scale. *Education:* The respondents educational background was measured using a 6 element Likert-scale, which ranged from 'some high school' which was coded as 1, through to 'doctoral degree' which was coded as 6. *Firm Age:* Firm age, or the number of years in which a respondents firm had been operating was measured using a ratio scale.

#### *6.3 Analysis methods*

Hierarchical multivariate linear regression was the main statistical technique used to describe the relationships between dependent and independent variables, and test the proposed hypotheses. Hypotheses were tested by introducing control variables, which could potentially influence the dependent variable, into an initial regression model. Subsequent regression models then added predictor variables (nominally in causal order), and noted the change in model predictive performance. This allowed later models to control for all the independent variables in prior models. Thus isolating, and measuring, the effect of a particular set of predictor variables, and test this influence for statistical significance. The use of the hierarchical regression technique allowed the analysis to focus on the testing of theory.

## **7 Results**

The ICT entrepreneurs in this study were predominately men (88.1%), who identified themselves as being of Australian ethnic origin (86.6%). The youngest entrepreneur was 20 years old, and the oldest 65 years, the average age was 44 years (see Table 1). The vast majority of respondents (88.2%) had some form of education beyond high school, with most attaining a bachelor's degree (35.3%) or post-graduate qualification (23.5%). The average entrepreneur had almost 10 years ICT industry experience prior to founding their businesses.

The data generally supported a social network view of opportunity recognition with almost all (95.7%) entrepreneurs listing at least one social contact with which they discussed their business opportunity prior to establishing their current firm. The median size of an entrepreneur's social network was between 3 and 5 people; and the majority (56.5%) had discussed their business opportunity with between three and ten social contacts.

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The general disposition towards trust of entrepreneurs in this study could be considered neutral ( $M = 3.12$ ,  $SD = 0.65$ , on a scale from 1 to 5, where 3 is “neutral”). This was confirmed by a t-test ( $t = 1.432$ ,  $p = 0.157$ ). Though the entrepreneurs disposition toward vigilance was slightly higher, it was still close to neutral ( $M = 3.60$ ,  $SD = 0.72$ ). A paired t-test confirmed the entrepreneurs lower level of trust than vigilance ( $t = -3.720$ ,  $p < 0.001$ )

Three composite variables in the opportunity recognition construct measured the number of business ideas an entrepreneur recognised; the number of business opportunities recognised; the number of opportunities pursued. A series of paired t-tests confirmed a process view of opportunity recognition (Ardichvili et al., 2003), with the number of business ideas recognised by entrepreneurs ( $M = 4.39$ ) significantly higher ( $t = 6.776$ ,  $p < 0.001$ ) than the number of business opportunities they recognised ( $M = 3.58$ ). Likewise, the number of business opportunities recognised was significantly higher ( $t = 5.753$ ,  $p < 0.001$ ) than the number of opportunities pursued ( $M = 2.53$ ).

Almost all entrepreneurs reported that their business idea (89.7%) or business opportunity (82.1%) changed to some extent, though most commonly they indicated that only a slight change was required. However, when considering the development between business idea and opportunity, the majority of entrepreneurs (55.2%) suggested that there was either a moderate or major change required. These data also suggest that there is a role for social contacts, with over three quarters (76.9%) of entrepreneurs reporting that they had changed their business idea based on discussions with social contacts.4.2

Insert Table 1 about here

### *7.1 Trust, vigilance and social networks roles' in opportunity identification*

#### *Business ideas*

Table 2 summarises the results of the hierarchical regression analysis used to test the set of three hypotheses that proposed associations between the number of business ideas recognised, interpersonal trust, vigilance, and social networks (Hypotheses 1a, 3a and 3b).

With dispositional trust and vigilance variables included in the regression equation (Model II) a significant relationship resulted ( $R^2 = 0.55$ ,  $F = 8.425$ ,  $p < 0.001$ ) which explained over half of the variance in the number of business ideas recognised by an entrepreneur. This second model significantly explained ( $\Delta R^2 = 0.17$ ,  $\Delta F = 10.573$ ,  $p < 0.001$ ) a further 17.4 percent of the variance in business ideas over the initial model which included only the control variables. As indicated by standardised regression coefficients, significant negative relationships were also found between business ideas and dispositional trust ( $\beta = -0.42$ ,  $t = -4.393$ ,  $p < 0.001$ ) and dispositional vigilance ( $\beta = -0.20$ ,  $t = -1.879$ ,  $p = 0.066$ ), although the significance of the dispositional vigilance relationship was marginal. As dispositional trust and vigilance were found to be significant predictors of the number of business ideas recognised, these data provided support for Hypothesis 3a and Hypothesis 3b.

### *Trust, vigilance and social networks roles' in opportunity recognition*

A third model (Model III) which included the number of social contacts as an independent variable, was also significant ( $R^2 = 0.56$ ,  $F = 7.504$ ,  $p < 0.001$ ), though the additional proportion of variance which it explained was small ( $\Delta R^2 = 0.01$ ,  $\Delta F = 0.615$ ,  $p = 0.436$ ). In this case, with dispositional trust and vigilance taken into account, the number of social contacts was not found to be a significant predictor of business ideas ( $\beta = 0.07$ ,  $t = 0.784$ ,  $p = 0.436$ ). Hence no support was found for Hypothesis 1a.

Insert Table 2 about here

### *Business opportunities*

Table 2 also summarises the results of the hierarchical regression analysis used to the three hypotheses, which proposed associations between the number of business opportunities recognised, interpersonal trust, vigilance and social networks (Hypotheses 1b, 3c and 3d).

The inclusion of dispositional trust and vigilance variables in a model with the 6 control variables (Model II) resulted in a significant regression relationship between the number of business opportunities recognised and these independent variables ( $R^2 = 0.38$ ,  $F = 4.050$ ,  $p = 0.001$ ). This model explained a marginally significant proportion ( $\Delta R^2 = 0.07$ ,  $\Delta F = 3.101$ ,  $p = 0.053$ ) of the variance in the number of business ideas recognised by an entrepreneur. Dispositional trust was found to be a significant predictor of business opportunities ( $\beta = -0.27$ ,  $t = -2.380$ ,  $p = 0.021$ ).

The subsequent model (Model III), failed to reveal any further significant relationships between business opportunities and the number of social contacts. In summary, the results of this analysis supported Hypothesis 3c, but failed to support Hypothesis 3d, or Hypothesis 1b.

## *7.2 Trust, vigilance and social networks roles' in opportunity development*

### *Opportunities pursued*

Table 3 summarises the results of the hierarchical regression analysis conducted to test the three hypotheses, which proposed an association between the number of business opportunities pursued; social contacts, interpersonal trust and vigilance (Hypotheses 2a, 4a and 4b).

As shown in Table 3, when dispositional trust and vigilance variables were added (Model II) a significant regression relationship was found ( $R^2 = 0.25$ ,  $F = 2.188$ ,  $p = 0.043$ ), which explained one quarter of the variance in the number of opportunities pursued. A significant amount of the variance in opportunities pursued (13.5%) was attributed to the addition of these two variables ( $\Delta R^2 = 0.14$ ,  $\Delta F = 4.838$ ,  $p = 0.012$ ), and a significant negative relationship was found with vigilance ( $\beta = -0.44$ ,  $t = -3.109$ ,  $p = 0.001$ ). However the subsequent model which included the number of social contacts in the regression equation (Model III) was confounded by its inclusion.

The results of this analysis suggested that, the lower an entrepreneur's disposition to vigilance was, the more likely they were to pursue an opportunity. Thus, these results

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suggested support for Hypothesis 4b, but failed to provide evidence which supported Hypothesis 4a or Hypothesis 2a.

Insert Table 3 about here

### *Change in opportunity*

It was proposed that entrepreneurial opportunities change as they are developed; and the level of change to an opportunity, was associated with the number of social contacts an entrepreneur used (Hypothesis 2b), as well as their disposition to trust and to vigilance (Hypothesis 4c, and Hypothesis 4d). Table 3 summarises the results of the hierarchical regression analysis conducted to test these three hypotheses.

Initial regression models (Models I & II) for the level of change in opportunity (see Table 3) were poorly described, and did not result in a significant relationships. Although trust was found to be a significant predictor of opportunity change ( $\beta = 0.27, t = 1.990, p = 0.026$ ), the evidence of its influence is weak. A final model which included the number of social contacts (Model III) resulted in a significant relationship ( $R^2 = 0.33, F = 2.834, p = 0.008$ ), which accounted for over 16 percent of the variance in opportunity change ( $\Delta R^2 = 0.17, \Delta F = 13.164, p = 0.001$ ). Importantly, the number of social contacts ( $\beta = 0.42, t = 3.628, p < 0.001$ ) was found to be a statistically significant predictor of the level of change in opportunity.

Overall, these data provided support for the proposition that change in entrepreneurial opportunity is positively associated with the number of social contacts (Hypothesis 2b), though they did not support dispositional trust or vigilance (Hypothesis 4c, and Hypothesis 4d).

## **8 Discussion**

In respect of the role interpersonal trust plays in the identification of entrepreneurial opportunities, the findings of this study indicated that an entrepreneur's disposition to trust and vigilance were important factors. The evidence in this study suggested that the number of business ideas, and business opportunities recognised had an inverse relationship with an entrepreneur's disposition to trust others. The lower an entrepreneur's general disposition to trust others, the more business ideas, and opportunities they recognised.

It has been proposed that entrepreneurs may have a general disposition to distrust (de Vries, 1996). However prior research has not sought to establish the importance of this assertion in relation to the processes of entrepreneurship. Moreover, the findings of this study did not suggest that the entrepreneurs disposition towards trust was low. The general disposition towards trust of the entrepreneurs in this research could be considered as essentially neutral. Thus, de Vries (1996) characterisation of entrepreneurs as distrustful is not supported in the findings of this research. What the findings of this research did show, however, was that an entrepreneur's disposition towards trust was an important determinant of the number of business ideas, and business opportunities they

### *Trust, vigilance and social networks roles' in opportunity recognition*

recognised. This relationship is not one, to the authors best knowledge, that has been established previously. Thus, this finding may be considered to add to the literature of entrepreneurial opportunity recognition. The findings of this study also suggested that an inverse relationship exists between dispositional vigilance and the number of business ideas an entrepreneur recognised. These two findings for dispositional trust and vigilance, suggest that a balance between trust and vigilance is beneficial to the identification of entrepreneurial opportunities. In some respects this supports Gurtman's (1992) suggestion that extremes of either distrust or trust are detrimental to interpersonal processes.

A finding of this research is that an entrepreneur's disposition to vigilance has an influence on the number of opportunities they pursued. The findings suggested that the lower an entrepreneur's disposition to vigilance, the more opportunities they pursued. This may be seen as supporting the inference that a disposition to excess vigilance inhibits the decision to pursue opportunity. In particular, this finding is important in considering the entrepreneur's decision to develop their opportunity beyond being a potentially viable business opportunity by assembling the resources required to initiate a new venture. This relationship has not, to the best of the authors knowledge, been previously established, and thus adds to the literature on entrepreneurial opportunity recognition.

The findings of this research also identified that the size of an entrepreneur's social network affected the level to which they altered their opportunity. That is to say, the larger an entrepreneur's social network, the more they changed their opportunity as they developed them. This finding supports De Koning's (1999) assertion that entrepreneurs used extensive networks to assist the evolution of their business opportunities. Also, that entrepreneurs take on feedback from their social network in order to develop their opportunities. A theoretical implication of this finding is that it supports the notion that entrepreneurial opportunity recognition is a function of social information processing (West, 2003). These findings would also suggest, that practicing entrepreneurs be encouraged to make use of extended social networks to develop their business opportunities.

## **9 Limitations**

This research has some recognised limitations. One is that the study used a cross-sectional research design, with a sample drawn from an industry specific population. Despite their limitations in drawing causal inferences, cross-sectional studies are common in empirical entrepreneurship research (Chandler and Lyon, 2001). By controlling for industry, the internal validity of this research was increased; however it was recognised that this might have an adverse effect on external validity. While the response rate for this study was low, it is comparable to many other studies in this field. Also, it must be acknowledged that the size of the sample from which the findings are derived is quite small. Therefore the conclusions of this study should be treated with caution, in any attempt to generalise.



## 10 Conclusion

This research sought to answer the question: What are the roles of social networks, interpersonal trust and vigilance in the entrepreneurial opportunity recognition process? In response to that question, it is the conclusion of this research, that both social networks and interpersonal trust have important roles in the process of opportunity recognition.

An entrepreneur's dispositions to both trust and vigilance effected the outcomes of his or her opportunity recognition behaviours. Should an entrepreneur's disposition be too trusting, he or she was less likely to identify entrepreneurial opportunities. Similarly, should an entrepreneur's disposition be too vigilant, he or she was also, less likely to identify entrepreneurial opportunities. Further, this research suggested that an excessively vigilant disposition, inhibits an entrepreneur's pursuit of opportunity. Also this research suggests that extended social networks and a trusting disposition facilitate the development of entrepreneurial opportunities.

These findings in relation to trust, have contributed to a greater understanding of the decision making of entrepreneurs in the process of opportunity recognition. However, as Shane and Venkataraman (Shane and Venkataraman, 2000) remind us, entrepreneurial thoughts and behaviours are not stable characteristics that differentiate some people from others across all situations. This serves to highlight that while dispositional trust or vigilance may not necessarily differentiate entrepreneurs from others, they are none the less important factors in the processes of entrepreneurship. This conclusion is novel, and thus, contributes to the literatures of entrepreneurship and opportunity recognition.

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**Note**

<sup>1</sup> This research was conducted while at the Graduate School of Management, Griffith University.

Table 1: Descriptive statistics and Pearson correlation coefficients

	Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	Gender†	1.87	0.34												
2	Age	44.87	9.53	-0.11											
3	Ethnicity†	0.13	0.34	0.15	0.06										
4	ICT industry experience	9.89	7.47	-0.27*	0.41**	0.08									
5	Education	3.76	1.21	-0.12	0.16	-0.08	-0.11								
6	Years of firm operation	2.33	1.32	-0.01	0.57**	0.16	0.27*	-0.12							
7	Trust disposition	3.12	0.65	-0.11	0.30*	0.06	0.10	0.20	0.12						
8	Vigilance disposition	3.60	0.72	0.02	-0.15	0.15	-0.08	0.21	-0.03	-0.11					
9	Number of social contacts	4.08	1.34	0.02	-0.10	0.01	-0.03	0.16	-0.10	0.10	-0.03				
10	Business ideas	4.39	1.57	-0.18	-0.51**	-0.13	-0.37**	0.04	-0.28*	-0.46**	-0.04	0.08			
11	Business opportunities	3.58	1.56	-0.10	-0.40**	-0.15	-0.34**	-0.17	-0.10	-0.36**	-0.04	0.00	0.82**		
12	Opportunities pursued	2.53	1.27	-0.17	-0.23	-0.14	-0.04	0.00	-0.12	-0.10	-0.30*	0.01	0.54**	0.49**	
13	Change to opportunity	2.54	0.91	0.04	-0.08	0.01	0.02	0.23	-0.14	0.25*	-0.01	0.51**	0.12	0.04	0.06

n = 63

† dummy variable- Gender: 1 indicates female; 2 indicates male; Ethnicity: 0 indicates Australian, 1 indicates non-Australian.

Level of statistical significance (two-tailed tests):

\* indicates  $p < 0.05$ .\*\* indicates  $p < 0.01$ .

Table 2: Results of hierarchical regression analyses for opportunity identification

	Independent Variable	Business ideas			Business opportunities		
		Model I	Model II	Model III	Model I	Model II	Model III
I	<i>Controls</i>						
	Gender§	-0.307**	-0.338***	-0.339***	-0.190	-0.211†	-0.211†
	Age	-0.439**	-0.366**	-0.351**	-0.368*	-0.320*	-0.308†
	Ethnicity§	0.000	0.067	0.061	-0.123	-0.080	-0.084
	ICT industry experience	-0.307*	-0.311**	-0.314**	-0.325*	-0.327*	-0.330*
	Education	-0.006	0.111	0.095	-0.203	-0.127	-0.140
	Years of firm operation	0.030	0.035	0.036	0.182	0.186	0.187
II	<i>Interpersonal trust</i>						
	Trust disposition		-0.417***	-0.423***		-0.271*	-0.276*
	Vigilance disposition		-0.196†	-0.188†		-0.127	-0.120
III	<i>Social networks</i>						
	Number of social contacts			0.071			0.057
	R <sup>2</sup>	0.381***	0.555***	0.560***	0.303**	0.375***	0.378**
	Adjusted R <sup>2</sup>	0.315	0.489	0.486	0.229	0.282	0.273
	ΔR <sup>2</sup>	0.381	0.174	0.005	0.303	0.072	0.003
	ΔF	5.745***	10.573***	0.615	4.061**	3.101†	0.275

Dependent variables: Business ideas and Business opportunities.

n = 63.

Standardised  $\beta$  coefficients.

§ indicates dummy variable.

Level of statistical significance (two-tailed tests for control and interpersonal trust variables all others were one-tailed tests):

\* indicates  $p < 0.05$ .

† indicates  $p < 0.1$ .

\* indicates  $p < 0.05$ .

\*\* indicates  $p < 0.01$ .

\*\*\* indicates  $p < 0.001$ .

Table 3: Results of hierarchical regression analyses for opportunity development

	Independent Variable	Opportunities pursued			Change in opportunity		
		Model I	Model II	Model III	Model I	Model II	Model III
I	<i>Controls</i>						
	Gender§	-0.202	-0.205	-0.205	0.095	0.116	0.112
	Age	-0.250	-0.351*	-0.351†	-0.136	-0.234	-0.145
	Ethnicity§	-0.112	-0.035	-0.036	0.027	0.016	-0.016
	ICT industry experience	-0.033	-0.024	-0.024	0.160	0.167	0.145
	Education	-0.041	0.089	0.088	0.276†	0.253†	0.158
	Years of firm operation	0.017	0.072	0.072	-0.075	-0.053	-0.047
II	<i>Interpersonal trust</i>						
	Trust disposition		-0.062	-0.062		0.267*	0.233*
	Vigilance disposition		-0.438**	-0.437**		-0.064	-0.014
III	<i>Social networks</i>						
	Number of social contacts			0.003			0.417***
	R <sup>2</sup>	0.109	0.245*	0.245†	0.088	0.157	0.325**
	Adjusted R <sup>2</sup>	0.014	0.133	0.117	-0.009	0.032	0.210
	ΔR <sup>2</sup>	0.109	0.135	0.000	0.088	0.069	0.168
	ΔF	1.148	4.838*	0.001	0.904	2.210	13.164***

Dependent variables: Opportunities pursued and Change in opportunity.

n = 63.

Standardised β coefficients.

§ indicates dummy variable.

Level of statistical significance (two-tailed tests for control and interpersonal trust variables all others were one-tailed tests):

\* indicates  $p < 0.05$ .

† indicates  $p < 0.1$ .

\* indicates  $p < 0.05$ .

\*\* indicates  $p < 0.01$ .

\*\*\* indicates  $p < 0.001$ .